universities. The records show that in 1835 there were 4 American students in the philosophical faculties of German universities; in 1860 there were 77; in 1880, 173; in 1891, 446; in 1892, 383; in 1895, 422; and in 1898, 397.

These figures show clearly that the increase in the attendance at American universities is not accounted for by a falling off in attendance at German universities. On the other hand, they do show that for the last ten years at least there has been no increase in the attendance at German universities, but rather a slight decrease.

Six thousand students are, then, to-day pursuing advanced courses in American universities, while not longer ago than 1875 the number was only about 400. In this connection it must further be borne in mind that during this period the colleges have not relaxed in their requirements. The tendency has been in the opposite direction. So that it means to-day more rather than less than it did in 1875 to be a graduate student. That there is an increasing demand for university work is clear, and it seems to be destined to play a more and more important part in the development of educational methods.

University work is not something apart, independent of other kinds of educational work. It is a necessary part of the whole system. It affects not only the colleges, but schools of all grades, and must, therefore, have a profound influence upon the intellectual condition of the whole country.

But the universities are also doing another kind of work of importance to the country. Through their specially prepared men they are doing something to enlarge the bounds of knowledge. To be sure, such work is also being done to some extent in colleges and elsewhere, but the true home of the investigator is the university. This work of investigation is as important as the work of training men. What does it mean? All persons with healthy minds appear to agree that the world is advancing and improving. We see evidences of this on every side. Those results that appeal most strongly to mankind are, perhaps, the practical discoveries that contribute so much to the health and comfort of mankind. These are so familiar that they need not be recounted here. If great advances are being made in the field of electricity, in the field of medicine, in the field of applied chemistry, it is well to remember that the work that lies at the foundation of these advances has been done almost exclusively in the universities. It would be interesting to trace the history of some of these advances. We should find that in nearly every case the beginning can be found in some university workshop where an enthusiastic professor has spent his time prying into the secrets of nature. Rarely does the discoverer reap the tangible reward of his work—that is to say, he does not get rich—but what of it? He has his reward, and it is at least a fair question whether his reward is not higher than any that could be computed in dollars and cents.

The material value to the world of the work carried on in the university laboratories cannot be over-estimated. New industries are constantly springing up on the basis of such work. A direct connection has been shown to exist between the industrial condition of a country and the attitude of the country towards university work. It is generally accepted that the principal reason why Germany occupies such a high position in certain branches of industry, especially those founded upon chemistry, is that the universities of Germany have fostered the work of investigation more than those of any other country. That great thinker and investigator, Liebig, succeeded during the last century in impressing upon the minds of his countrymen the importance of encouraging investigations in the universities, and since that time the German laboratories of chemistry have been the leaders of the world. In Germany the chemical industries have grown to immense, almost inconceivable, proportions. Meanwhile the corresponding industries of Great Britain have steadily declined.

What I want to make clear is that universities are not luxuries, to be enjoyed or not, as we may please. They are necessities. Their work lies at the very foundation of national well-being.

The best thing we can do for our students is to give them good professors. Sumptuous laboratories, large collections of books and apparatus, extensive museums are well enough. They are necessary, no doubt. But I fear they are too much emphasised before the public. A university is, or ought to be, a body of well-trained, intelligent, industrious, productive teachers of high character provided with the means of doing their best work for their students, and therefore for the world.

NOTES.

PROF. WINOGRADSKY, of St. Petersburg, has been elected a correspondant of the Paris Academy of Sciences, in the Section of Rural Economy.

THE seventy-fourth meeting of the German Association of Naturalists and Physicians is this year to be held on Austrian soil, Carlsbad being the town selected, and the date September 21 to 27. The arrangements will be generally the same as those introduced at Hamburg last year, but it has been decided to add a new division to the medical group—the history of medicine—so that the scientific side will be represented by eleven divisions, as before, and the medical by seventeen.

THE following are among the lecture arrangements at the Royal Institution, after Easter:—Dr. Allan Macfadyen, three lectures on recent methods and results in biological inquiry; Prof. Karl Pearson, three lectures on the laws of heredity, with special reference to man; Prof. Dewar, three lectures on the oxygen group of elements; and Dr. A. Smith Woodward, three lectures on recent geological discoveries. The Friday evening meetings will commence on April 11, when Prof. Dewar will deliver a discourse on problems of the atmosphere. Succeeding Friday evening discourses will be delivered by Dr. J. Mackenzie Davidson, Sir Robert Ball, Sir Benjamin Baker, Mr. A. E. Tutton, and other gentlemen.

WE regret to see the announcement of the death of Sir Richard Temple, Bart., M.P., F.R.S., whose personality was well known in scientific and educational circles. He was vice-chairman of the School Board of London for three years from 1885 and afterwards chairman of the finance committee of the Board. He was also president of the Social Science Congress held at Huddersfield, and the author of several works on Indian and Eastern topics.

THE death is announced of Mr. Robert Pendlebury, fellow of St. John's College, Cambridge, and well known by his mathematical work. Mr. Pendlebury graduated in the mathematical tripos of 1870 as senior wrangler. He also graduated at the University of London, obtaining the senior University scholarship for mathematics and natural philosophy. He was in due course elected to a fellowship at St. John's, and for many years was one of the college lecturers in mathematics. He was also University lecturer in mathematics, but recently resigned all his appointments. He had been an examiner for the mathematical tripos on several occasions, and for some time a member of the Special Board for Mathematics.

WE learn from the *Victorian Naturalist* that the Central Australian expedition under the leadership of Prof. Baldwin Spencer and Mr. F. J. Gillen reached the Macarthur River, Northern Territory, but was detained at Borroloola, a small township about 50 miles from the mouth of the river, owing to the foundering of the steamer which should have taken them on to Port Darwin as previously arranged. The matter of affording the expedition some relief was brought before the Commonwealth Parliament without result. However, the Premier of Victoria (Hon. A. J. Peacock) placed himself in communication with the Queensland Government, and it was arranged to send a small steamer from Normanton and bring the party on to that port, from whence there is frequent communication with eastern Australia.

IT is announced in the *Times* that the two Royal medals of the Royal Geographical Society have been awarded to Sir F. D. Lugard, for his African explorations and surveys, and to Major Molesworth Sykes, for his journeys in Persia, extending over nine years, and his valuable studies of the geography of the country. The other awards of the society have been made as follows:—The Murchison grant to Mr. J. Stanley Gardiner, for his researches in Funafuti Island in the Pacific and the Maldive Islands in the Indian Ocean; the Gill memorial to Mr. G. G. Chisholm, for the services he has rendered during twenty-five years to geographical education by text-books of various kinds, atlases and lectures, all of a high standard of value, as well as for his geographical investigations, among other subjects into cataracts and waterfalls, and on the sites of towns; the Back grant to Lieut. Amdrup, of the Danish navy, for his two voyages of exploration to the east coast of Greenland, during which he surveyed and mapped in detail much of the coast hitherto unknown or imperfectly mapped; the Peek award to Mr. J. P. Thomson, the founder of the Queensland branch of the Australian Geographical Society, who, by his writings and in other ways, has done much to promote the interests of geography in Queensland.

THE Naples Academy (mathematical and physical section) has awarded the prize for natural sciences for 1901 to Dr. Marussia Bakunin, the authoress of six printed papers dealing with stereochemistry. The subject announced for the next award (entries closing June 30, 1903) is the formation of urea in the animal organism.

THE prize awards of the Reale Istituto Lombardo for the year 1901 are as follows:—Triennial medals to Prof. Giuseppe Sartori, of Brescia, for preparation of butter with acidified cream, and to Pietro Gamberini, of Milan, for photographic apparatus. Under the Brambilla foundation, a gold medal and 1000 lire to the Società del Laminatojo di Malavedo for the production of soft steel, a similar award to Franchi e Griffin for the wheels of tempered iron (suitable for tramcars and other rolling stock) made by the Griffin process, and a gold medal and 500 lire to Turrinelli and Company for their introduction into Milan of a service of public automobiles worked by electricity. A Fossati foundation award of 1000 lire to Dr. Carlo Martinotti, of Turin, for his macro- and micro-scopic researches on the encephalus of the higher animals. Pizzamiglio foundation prizes of 1500 lire to Dr. Alfredo Piazzi, of the University of Turin, and of 750 lire to Dr. Guido Jona, of Savona, for essays on secondary education. Under the Tommasoni foundation, for studies of the life and works of Leonardo da Vinci, awards of 1000 lire to each of the three competitors, comprising Dr. N. S. Scognamiglio, Prof. G. B. de Toni and Edmondo Solmi.

THE number of the *Rendiconti* of the Lombardy Institution containing the announcements of prize awards also gives a list of future subjects for prizes. Of the prizes of the Institution, that for the present year (entries closing March 31, 3 p.m.) is for a toponomastic exploration of some district of Lombardy; that for 1903 is for some original contribution to our knowledge of the theory of transformation-groups as founded more particularly by Liè. The two triennial medals for 1903 will be offered, as usual, for improvements in the agriculture and in the manufacturing industries in Lombardy. For the Cagnola prizes, the subjects selected by the Institution are, for 1902 (entries closing April 1), the study of the effects of the gases emanating from various manufactories on the growth of cultivated plants, and for 1903, a monographic study of hypophysis. The four subjects selected by the founder for the remaining Cagnola prizes deal with the the cure of pellagra, the nature of miasma and contagion, aërial navigation, and the prevention of forgery, and in connection with the second subject it is suggested in a footnote that competitors might deal with prophylactic measures against malaria considered in connection with our present knowledge of the biology and mode of diffusion of the microbe of this disease. The Brambilla prize is offered for improvements in the manufactories of Lombardy. The Fossati prize for 1902 is for macro- and micro-scopic researches on the encephalus of the higher animals, for 1903 on the nuclei of origin or termination of the cranial nerves, and for 1904 on the localisation of certain cerebral centres. The Kramer prize, confined to Italian engineers, is offered for a report on systems of electric traction. The Secco-Comneno prize is for a description of the Italian natural phosphatic deposits and their practical uses (entries closing April 30, 3 p.m.). A prize is offered under the Pizzamiglio foundation to Italians for an unpublished manuscript on the influence of modern socialistic doctrines on private rights. Ciani prizes are offered for popular Italian literary works, a triennial Zanetti prize (entries closing March 31) is offered to an Italian pharmaceutical chemist who shall obtain a result which is considered of use in the progress of pharmaceutical and medical chemistry, and a Tommasoni prize for 1905 for a study of the life and works of Leonardo da Vinci.

THE thirteenth session of the International Congress of Americanists will be held in the American Museum of Natural History, New York City, October 20-25. The object of the Congress is to bring together students of the archæology, ethnology and early history of the two Americas, and by the reading of papers and by discussions to advance knowledge of these subjects. Communications may be oral or written, and in French, German, Spanish, Italian or English. The papers presented to the Congress will, on the approval of the Bureau, be printed in the volume of the *Proceedings*. The subjects to be discussed by the Congress relate to:—(1) The native races of America, their origin, distribution, history, physical characteristics, language, inventions, customs and religions; (2) the history of the early contact between America and the Old World. All persons interested in the study of the archæology, ethnology and early history of the two Americas may become members of the Congress by signifying their desire to Mr. Marshall Saville, general secretary of the Commission of Organisation, American Museum of Natural History, New York, and remitting either direct to the treasurer (Mr. Harlan I. Smith, American Museum of Natural History) or through the general secretary, the subscription of three dollars. Mr. Morris K. Jesup is president and the Duke of Loubat vice-president of the Commission of Organisation.

THE Government Report of the Committee on Acetylene Generators, which has just been issued by H.M. Chief Inspector of Explosives, shows that the acetylene industry has attained a position of no little importance. Consisting of some thirty pages, the Report, which is the outcome of the work of a strong committee, contains some valuable tabulated results of tests on forty-six specified generators, showing their gas production, efficiency, and maximum pressure in the generating chamber and in other parts of the plant. It speaks very highly for the industry that every one of these generators sent in for examination has been reported by the Committee to be satisfactory. We share the opinion of the Committee that many of the generators on the market are too complex in construction, and when prime cost, space, loss of water and of gas by solution are not important considerations, we agree with the view that the non-automatic generator, on account of its certainty and simplicity, is to be preferred to the automatic type. A list of what the Committee consider the conditions which a generator should fulfil in order to be considered safe should be of great value to those engaged in the design of acetylene plant. The only thing to which exception may be taken is a limit of five inches water pressure suggested for the gas in the service mains; by raising this limit to six or seven inches, the possibilities of using the gas for heating purposes would be greatly increased, and, as we believe that it is generally admitted that under pressures of less than two atmospheres there is no danger of spontaneous decomposition, such an increase does not seem objectionable, though a three to four inch limit might be imposed for lighting purposes alone. We should like to have seen some remarks upon the purification of the gas and the ventilation of buildings in which it is used in an unpurified condition. Two-thirds of the Report is devoted to the description, with many illustrations, of the types of generators tested. This is valuable as a summary of the catalogues of various makers, but we wish the Committee had seen its way to make some criticisms upon these various types, as was done some time ago by those responsible for the exhibition of generators which was held at the Imperial Institute.

AN advance proof of a Parliamentary paper, received from the Home Office, shows that the total output of coal of the United Kingdom in the year 1901 amounted to 219,037,240 tons, as compared with 225,170,163 tons in the preceding year. The outputs of some other minerals were as follows, the numbers representing tons:—copper ore and copper precipitate, 6792; iron ore, 1,671,025; ironstone (worked under Coal Mines Regulation Acts), 6,849,926; lead ore, 32,552; rock salt, 151,348; tin ore (dressed), 6542; zinc ore, 23,582.

PROF. HERDMAN has written to Mr. I. C. Thompson to say that his investigation of the pearl fisheries of the Gulf of Manaar is being greatly facilitated by everyone interested in it at Ceylon. A steamer—the *Lady Havelock*, of three hundred tons—has been chartered, and a start was made at the end of January. Dr. A. J. Chalmers has given Prof. Herdman the use of a room in his laboratory at Colombo, and Mr. J. C. Willis has offered a work place in his laboratory at the magnificent Botanic Gardens at Peradeniya. Prof. Herdman adds:—"I found up country at Anurhadapura (one of the 'buried cities' of Ceylon) the two Germans, Dr. Paul and Dr. Fritz Sarasin, who have been exploring for years in Ceylon, and were the only people who could give me information about Trincomalee, where I wish to dredge. Finally, I met Prof. Alex. Agassiz, just returned from his expedition to the Maldive archipelago, and he kindly lent me 600 fathoms of especially strong and flexible steel rope, which will be a valuable addition to our tackle. Prof. Agassiz, you will be interested to hear, says he has had a most successful trip, and has secured all the information, photographs and specimens of the coral reefs that he desired. He says the Maldives are the last of the great coral archipelagoes which he had set before himself to examine, and that now he is prepared to write his book on the general subject, 'Coral Reefs and Islands.' There can be no doubt that he has a much more extended personal knowledge of the reefs of the world than Darwin, Murray, or any other previous writer."

AN interesting description of an experimental locomotive appears in the *Times* of March 12. The boiler is an entire departure from ordinary practice; in fact, it may be called a water-tube boiler applied to the locomotive. To Mr. Dugald Drummond, of the London and South-Western Railway, is due the credit for this innovation, and it will be interesting to watch its development. Mr. Drummond has long experimented with water-tubes in the fire-box of the ordinary locomotive with much success, a system originally patented by Mr. W. S. Smith, of the North-Eastern Railway. The modified boiler consists of an ordinary locomotive boiler shell and an ordinary shaped fire-box, but in place of the large number of tubes usually used, one large flue-tube is fitted and this contains many water-tubes; there are also water-tubes in the fire-box. It will, therefore, be seen that the products of combustion on their way from the fire-box to the smoke-box must pass through the large flue-tube and encounter the many water-tubes in it. The locomotive fitted with this boiler has been working the west country expresses between Waterloo and Salisbury with gratifying results. Steam is stated to be maintained with ease. The coal consumption recorded with a train of twelve carriages was under 29 lbs. per mile; it would have been more satisfactory, however, had the weight of the train been stated, because the consumption is decidedly low. This type of boiler should be of much use on locomotives of the ten-wheeled description. The excessive length of ordinary tubes required in this class is out of all proportion, from a heating-surface point of view, such engines having tubes nearly 16 feet long and only 2 inches in diameter, whereas with Mr. Drummond's new boiler a long barrel would be a decided advantage. It is evident that very perfect combustion is possible; the gases are well mixed in the large flue and the flame is less likely to be extinguished on its way to the smoke-box.

A PAPER by Mr. T. R. Rao on the Yánádis of the Nellore district, Madras Presidency, appears in the *Bulletin* (vol. iv. No. 2) of the Madras Government Museum, from which the accompanying illustration of a method of making fire has been reproduced. To produce fire by friction in this way, the Adivi or forest Yánádis prepare two sticks—one short, the other long. In the former a square cavity is made, and it is held firmly on the ground, while the long stick is twirled rapidly to and fro in the hole. No charcoal powder is used, but a rag, or even dried leaves, are ignited. The Yánádis possess the characteristics of jungle tribes, and are little removed from savagery, the culture being that of the Palæolithic stage. This is indicated by the absence of implemental or monumental material, the animistic, and to some extent zoo-theistic, nature of the religion, the primitive hunting and fishing methods followed by many of the tribe, and the habit of eating the almost raw flesh of the game they kill, after slightly heating or scorching it. The Yánádis are fearless in catching cobras, which they draw out of their holes without any fear of their fangs. They appear to protect themselves against the effects of snake-bite by swallowing the poison sacs of snakes.

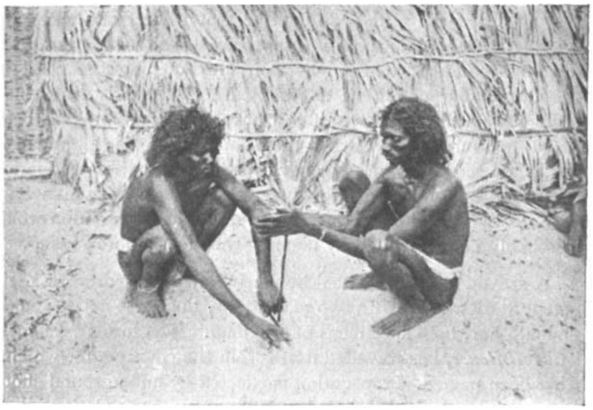

FIG. 1.—Yánádis making Fire.

IN a paper entitled "Environment in Relation to Sex in Human Culture" in the *Popular Science Monthly* for January, Dr. Otis T. Mason gives a series of notes on the main characteristics of the chief cultural areas of America which will be useful to those who desire to obtain a general survey of aboriginal American sociology.

IN the *American Anthropologist* (n.s. vol. iii. p. 737), Dr. G. A. Dorsey describes the recent progress in anthropology at the Field Columbian Museum in Chicago. Thanks to an energetic and efficient staff and the enlightened liberality of Chicago merchants, this museum is fast assuming a place in the front rank of the great anthropological museums of the world. This record by Dr. Dorsey is enough to make us feel ashamed of ourselves in this country, as it is only a sample of what is being done in other American museums and institutions.

THE most interesting article to the general reader in the current number of the *Bulletins et Mémoires de la Société d'Anthropologie* (v. sér. tome 2) is one by M. C. Lejeune on the representation of sex in religion, art and education. A paper on the normal and varietal myology of the fox appears out of place in an anthropological journal. Various reproductions are given by M. E. Rivière of the mural paintings of animals from the cave of La Mouthe, similar to those to which we have recently directed attention (p. 299). It will be remembered that M. Rivière was the first to discover these paintings. A paper by M. G. Cauderlier on the causes of the depopulation of France gave rise to an interesting discussion.

IN the *Bulletin* issued by the Botanical Department at Trinidad and edited by Mr. Hart, under the heading of "Root Irritation," reference is made to the difficulty of planting out young mangosteens, cloves, or Palmyra palms. If the seeds have been started in pots, when transferred to the open ground the young plants have a strong tendency to die off. It is suggested that this may be due to the tender nature of the roots or root hairs, which seem to suffer if they are disarranged or carelessly handled in the process of transplanting. In the case of the mangosteen this question has a most important bearing, for the life of the seed is so fugitive that it becomes necessary to start the seed in pots if plants are to be forwarded to a distance; then besides the necessity for keeping the plant in good growing condition on the journey, there is the added danger of losing it when it is transplanted. Another extract from the same paper refers to the slow and irregular germination of balata seeds (*Mimusops globosa*), which may take any period from three months to two years. These seeds have a hard exterior which takes up water slowly, so that germination would probably be accelerated by piercing the seeds before sowing.

A SMALL pamphlet issued by the Indiana Agricultural Experiment Station deals with two plant pests, the horse nettle and the buffalo bur, both specimens of Solanum. The former, *Solanum Caroliniense*, has travelled north from the county after which it has been named. Propagation is effected by underground shoots and also by seed. While it is easy to prevent the plant seeding, shoot propagation is not so easily checked. Ploughing cuts up the shoots, and then each portion may develop independently. Constant hoeing, however, provides a remedy, as by continual cutting the propagative power is finally exhausted; or the plant may be smothered by sowing rape or barley or other quick-growing crops. The buffalo bur, *Solanum rostratum*, has a spiny stem and fruit. It is a typical xerophyte from the south-west, from the counties of Texas and Nebraska. It seems to have been carried eastward as an impurity with other seeds. Being an annual it is more easily strangled, although it has an ll icit habit of throwing up short fruiting branches if it is cut near the surface of the ground.

AMONG several interesting biological articles in the *Sitzungsberichte* of the Bohemian Scientific Society for 1901, one by Dr. J. V. Rohon on the anatomy and histology of the Devonian dermal plates and spines described as Psammosteus is of special importance. It was pointed out by Agassiz and Pander that the histological structure of these spines seemed to indicate affinity with the sharks; and Reis concluded that both Psammosteus and Pteraspis were degenerate selachians. This view is not accepted by the author, who regards both these groups of armour-clad Devonian fishes as specialised types, indicating two nearly related families. In Dr. Smith Woodward's "Catalogue of Fossil Fishes in the British Museum" the systematic position of Psammosteus was left undetermined, although some countenance was given to the theory of its selachian affinity. To the same serial Mr. J. Palacký contributes an article on the distribution of edentates and another on that of bats.

IN the *Aarbog* of the Bergen Museum for 1901, Mr. O. Nordgaard gives the results of his investigations as to the food of the coal-fish (*Gadus virens*) at different portions of its existence. From the stomachs of young individuals the author took no less than thirty distinct kinds of organisms. From this it appears that during the first year of its existence this cod subsists chiefly upon plankton. Generally this fare is sufficient, but if it fail the fish resorts to sea-weeds, where it feeds upon various minute crustaceans, young molluscs and even hydroid polyps. From the stomach of one individual were taken no less than 6250 copepod crustaceans—representing the average fauna of about 20 cubic yards of water. The stomachs of older coal-fish contained herrings, sprats, the salmonoid Mallotus, sand-eels, the cephalopod Ommatostrephes, and various crustaceans, among them Boreophausia. It is further proved that coal-fish prey on their own offspring as well as on those of the cod. In the northern fjords of Norway, where very large catches of coal-fish are sometimes made (34,000 head in the autumn of 1898), the great shoals appear to be brought together by their pursuit of herrings and Ommatostrephes. In December and January, however, a great influx of spawning coal-fish reaches the western coast of Norway.

WE have received a copy of the extremely interesting and suggestive presidential address on "The Nature of Disease," delivered by Sir T. N. Fitzgerald before Section H of the Australasian Association at Hobart in January last. After referring to the importance of sanitation, the president of the section dwelt on the evidence in favour of the hereditary nature of neurotic affections, and—in contrast to this—the comparative rarity with which deformities and malformations are inherited. In this connection he deprecated the common prejudice against the marriage of cousins, which he regarded in many respects as specially suitable. Physical diseases, other than syphilis, are also regarded as non-hereditary; and the theory of the transmissibility of many of them by infection is strongly supported. Consequently, the author of the address is greatly in favour of the isolation and notification of phthisis. In treating of the intrinsic causes of disease, emphasis was laid on the part played by bacilli, and some interesting observations are added in reference to the readiness with which the bacillary hypothesis was received by the medical profession almost as soon as it was propounded. In reference to the harm caused by alcoholism, the following sentences are worthy of quotation:—"The bicycle, I venture to say, has done more to elevate the people in the matter of temperance than a week of lectures have been able to effect. It is in this direction, then, in my opinion, that philanthropists should work. I have lived too long not to recognise 'the dullness of the lives of the masses,' and how productive of evil this lack of variety must be."

THE fifth volume of the new edition of Thompson's "Gardener's Assistant," edited by Mr. William Watson, has been published by the Gresham Publishing Company. When the sixth (and last) volume has appeared, the complete work will be reviewed.

THERE is only one opinion among men of science as to the necessity for spreading abroad the gospel of scientific truth and righteousness taught by Huxley. A sixpenny edition of a selection of his "Lectures and Essays," just published by Messrs. Macmillan and Co. in conjunction with the Rationalistic Press Association, should do much to cultivate this desirable interest in science and philosophy. The contents include lectures on evolution and the physical basis of life, and essays on aspects of agnosticism and ecclesiasticism which may lead incipient rationalists to firm ideas "on the nature, the duties and the non-insoluble problems of human life."

A COPY of Hazell's Annual for 1902, edited by Mr. W. Palmer, was received a few days ago from the publishers, Messrs. Hazell, Watson and Viney, Ltd. The annual is so well known and widely used that little need be said as to the character of the contents. Certainly no better epitome of the subjects which attracted general attention during last year is available; and no manual can be better depended upon to give concise and accurate information concerning public men and affairs and national interests. Among the subjects of new articles in the present edition we notice anthropology, archæology, astronomy, biology, chemistry, electricity, geography, geology, meteorological office, motor vehicles, photography, telephones and universal time. Under each of these headings a short account is given of progress made during last year. These summaries are naturally of very little value to the student of science, but they serve to give general readers a view of some of the results attained. Under biology, less than a dozen subjects are mentioned—all of them zoological—and there is no reference to botany either under this heading or elsewhere in the book. Other subjects we miss are physics, metallography (to which a paragraph might well have been devoted), radiations from radium and similar substances, malaria and mosquitoes. In the list of educational associations we find the usual secondary school organisations, but not the Association of Technical Institutions, to which practically all the principals of our technical school belong.

THE overproduction of alcohol, a consequence of the overproduction of sugar, has led to many attempts to increase its use for purposes of lighting and heating. In contrast to the repressive action of our own authorities in this matter, the strangling action of which in our chemical industries is well known, M. Jean Dupuy, the French Minister of Agriculture, organised a conference in December last to discuss the best means of extending the use of denatured alcohol for lighting and heating. The current number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale* contains a report of this conference by M. Lindet, and gives a complete account of the numerous forms of alcohol burners which have been devised both for lighting and heating. In conclusion, M. Lindet discusses the question as to the cost of heating and lighting by alcohol in comparison with the methods in current use, and especially with reference to petroleum, and points out that although petroleum has a slight advantage in the matter of cost, this is more than counterbalanced for domestic purposes by the cleanliness and freedom from smell of the alcohol.

THE same number of the *Bulletin* contains an interesting review, by M. Ach. Livache, of the methods in use for the destruction or utilisation of town refuse. The processes in use fall mostly under two types, incineration, which has been chiefly developed in this country, and treatment by reduction, in which either a solvent or superheated steam is used. The latter is mostly in favour in the United States. The relative advantages of the two methods are critically examined, it being pointed out that no hard and fast rule can be laid down which will be applicable to all cases, a careful examination and analysis of the refuse which it is proposed to treat being an indispensable preliminary.

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mrs. A. Clayton; a Common Otter (*Lutra vulgaris*) British, presented by Mr. W. H. Radcliffe Saunders; a Naked-footed Owlet (*Athene noctua*) European, presented by Mrs. Tewson; a Larger Hill Mynah (*Gracula intermedia*) from Northern India, presented by Miss F. V. Cooper; a Mute Swan (*Cygnus olor*) European, presented by Mr. R. S. Lindley; a South African Ground Hornbill (*Bucorvus cafer*) from Zululand, presented by Major C. H. Rowley, D.S.O.; three Lions (*Felis leo*) from South-west Africa; a Malayan Bear (*Ursus malayanus*) from Malacca; a Bennett's Cassowary (*Casuarius bennetti*) from New Britain, deposited; two Common Rheas (*Rhea americana*) from South America; a Sœmmerring's Pheasant (*Phasianus soemmerringi*) from Japan; twelve Goldeneyes (*Clangula glaucion*) European, purchased.

OUR ASTRONOMICAL COLUMN.

NEBULA AROUND NOVA PERSEI.—A circular from the Centralstelle at Kiel announces the receipt of an interesting communication from Prof. Max Wolf concerning the changes in the nebulous surroundings of Nova Persei. On March 5 he obtained a fine photograph with an exposure of four hours, which showed that all the former condensations had become weaker. From the Nova towards the south-west there now extends a new long zone of nebulosity much brighter than the previously existing condensations. Indeed on February 3, the date of the last previous photograph, this region was very bright. It is extremely interesting that this later nebulosity is brighter than the appearance of August, 1901. The same circular also announces a communication from the Lick Observatory stating that from recent photographs with the Crossley reflector Perrine finds no evidence of polarisation in condensations A and D of the Nova Persei nebula.

NEW VARIABLE STAR, 3, 1902 (MONOCEROTIS).—Prof. W. Ceraski, of Moscow, announces the variability of the star B.D. + 6°·1462,

$$\left.\begin{array}{l}\text{R.A.} = 6\text{h. } 50\text{m. } 37\text{s.}\cdot 4 \\ \text{Decl.} = +6^\circ\ 21'\cdot 4\end{array}\right\}(1855\cdot 0).$$

The star was near maximum about February 20, being then about 7·0 mag. The determination was photographic, but there is not sufficient data yet available to calculate the period. The magnitude in the B.D. is 8·0 (*Astronomische Nachrichten*, Bd. 158, No. 3775).

SEISMOLOGY IN AUSTRIA.

AT the present time the shelves of libraries throughout the world are bending beneath volumes of statistics, the analysis of which it is hoped will lead to the discovery of something new. To these piles of undigested materials, if we surmise correctly, there is shortly to be added an inundation of statistics from those who study earthquakes. Twenty years ago, seismologists were few and far between, but now they have increased in number and are represented by organised societies, which publish journals and reports. The first of these had its origin in Japan. Fifteen years later a corresponding body appeared in Italy, following on the heels of which came commissions and committees with similar objects in various European countries. Even the time-honoured routine of many meteorological and magnetical observatories has not been allowed to rest in peace, and the daily round at these establishments includes a visit to the seismographs.

As illustrative of these new departures, we call attention to what is being done by the Royal Academy of Sciences in Vienna. In 1895 this body established a Commission for the Observation of Earthquakes, the reports of which were published in the Academy's *Transactions*. Possibly on account of their size they are now issued as separate numbers, twenty-one of which form the first series. Of the second series six parts have been issued, a brief notice of which will give an idea of the extensive and valuable investigations now being carried out in Austria.

The key to this work is found in part ii. of the series, which its author, Dr. E. v. Mojsisovics, describes as a general report of shocks recorded in Austria in the year 1900. From this